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Four studies conducted on junior and senior high schools which have used some form of modular scheduling suggest that a proper way ro evaluate flexible scheduling includes observation of behavior, the measurement of attitudes and opinions, and assessment of pupil achievement. The studies reported were conducted on the Fresno Unified School District in California, the LaDue high school in Missouri, and the Delevan-Darien High School in Delevan, Wisconsin. The fourth study was conducted on a high school by Gerald P. Speckhard. It is concluded that (1) observable behavior can be evaluated by recording patterns of classroom activity; (2) student, teacher, and parental views of flexible scheduling can be assessed via opinionnaires; (3) the relative effectiveness of independent study, large group instruction, and small group activity can be evaluated through the use of opinionnaires; and (4) teaching effectiveness can be determined through comparative achievement testing. (HW)

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EVALUATION OF THE OUTCOMES OF MODULAR SCHEDULING

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EVALUATION OF THE OUTCOMES OF MODULAR SCHEDULING

Over fifty years ago John Dewey wrote of the conflict that existed between what educators knew to be the best way to teach children and the methods actually used. He wrote in Democracy and Education.

> Thus we have the spectacle of professional educators decrying appeal to interest while they uphold with great dignity the need of reliance upon examinations, marks, promotions and emotions, prizes, and the time-honored paraphernalia of rewards and punishments.

Teachers typically took a rigid, lecture, homework, recitation approach to learning. In the 1920's the Winnetka plan of education was considered to be on the frontier of all that was exciting and meaningful in education. Dr. Carleton Washburne (who died recently) promoted the idea that the education of children should be tailored to the child's own best rate. He vigorously opposed the lockstepped approach to learning in which children within a class had to all keep pace with each other, regardless of their ability.

These two examples suggest that educators have had wide disagreement in the past on what the best approach is to learning. Flexible scheduling affords a kind of education that is designed for the individual needs of the pupil. Although educators have been probing and discussing ways to individualize learning for most of the twentieth century, only within the last few years has there been such a ground swell of interest in developing innovative methods and techniques to provide the best education possible for our children. We now have 'modern' curricular courses in the sciences, mathmatics, and English. We now offer transformational grammar to elementary school children. Some of the content learned by the graduate students in the last ten years is now being offered at the 9th and 10th grade level. Computer assisted instruction and computer managed instruction show promise of individualizing learning for our children. The co-ordination of the library, audio visual materials and other resource materials into a central instructional materials center is another indication of change for better education. Team teaching is becoming popular in our country. Many schools now enjoy a large group lecture with small discussion group activities in such areas as social sciences, English and science.

Another innovation that educators are currently discussing across our land is flexible modular scheduling. Harvard, M.I.T., and Purdue made some early attempts at developing such an approach to education, but Dwight Allen and Bob Oakford (who is an industrial engineer) from Palo Alto really have developed the first widely adaptable flexible modular scheduling program referred to as the Stanford 4S program. Even so, only about 150 schools in the United States are actively engaged in the use of the 4S flexible scheduling at the present time.

Flexible scheduling needs to be defined so that no confusion exists in the mind of the reader. The flexible schedule program is based upon certain educational assumptions which include: (1) There are certain major subject matter fields which should be available to all students on the basis of their interest and ability to pursue them. Progress within each major subject field should be based on the demonstrated performance attainment of established standards. The major subject matter fields are the visual, performing and practical arts, languages (foreign and English), mathematics, natural sciences, physical education and health, social sciences, vocational subjects and guidance. (2) In each subject area groups of students can be identified whose needs require a discrete program of studies. The identifiable needs of the students may be categorized as achievement and ability; motivation, pace and style; and goals. The placing of students in a group should be appropriate to the purpose of the group and the relevance of the learning activities to the students in the group. Ideally, the rate of a student's progress through a school program should be determined by the readiness of the individual to move from one stage to the next. (3) Each subject when properly taught will include four basic types of instruction. These four basic types of instruction are independent and individual study, small group instruction, large group instruction, and laboratory instruction. The size of a group and the time allotted to a group should be appropriate to its purpose. Thus, class size, room size, and types of facilities should vary depending upon the needs of the learners and the learning activities employed. (4) Adequate instruction in each subject matter field requires various staffing patterns of teachers and non-professional supporting staff to best utilize the various talents, skills, experience and competencies of all of the school personnel.

According to the late Dr. Dave Beggs from Indiana, the behavioral objectives of education that the flexible schedule is designed to meet are in rank order:

(1) to improve instruction.
(2) to use teaching talent more effectively.
(3) to provide students with an opportunity to study independently.
(4) to provide a practical means of individualizing instruction.
(5) to conserve teacher time.
(6) to provide better sized learning groups.
(7) to provide better use of facilities.

No educator would disagree with Begg's objectives as being important. However, some may agree that these objectives can be met apart from a flexible schedule. I'm sure that many effective teachers today are aware of ways in which to better meet the needs of boys and girls. The question of interest is however, "Can a flexible schedule provide a structured approach for improving the learning opportunities of our youth?" That is, curriculum and structure be designed so as to enable teachers to have the time needed for planning and individualizing instruction? Certainly all would agree that teachers today are expected to be creative, innovative, up-to-date and informed. Can the schedule provide time needed for teachers to grow professionally, to prepare adequately, and still have enough time to meet students with individual learning needs.

A recent survey was completed for a Unified School District in California by Dr. Donald DeLay and Olan Knight[1] (two men who currently consult widely with regard to flexible modular scheduling.) The survey was done to assess the educational program at the junior high and senior high level. Some of their findings were rather shocking. They investigated student opinion about student selection of learning activities, program, student inquiry, intrinsic reward and student self-esteem.

It was found that as students grow older or progress from junior high to senior high school that the students feel less freedom to select activities for learning in the classroom. Apparently the tendency was to teach all of the students in the same way with the same content.

Over 1/2 of all students interviewed felt that most of what they were taught in the classroom was irrelevant and had no real world application for them. One can speculate that students will have difficulty in applying themselves to content material which they perceive as being of little value. Many students indicated that because of the irrelevancy of their teaching they "tuned the teacher off" most of the time. Apparently the lack of opportunity for students to choose or help decide the mode and content of instruction leads to student and teacher apathy.

In addition, forty percent of the students felt that the teachers talked or lectured 90% or more of the time. There was a tendency for teacher lecture to increase from 30% to 90% from junior high to senior high school. In other words, as students get older the teacher directs more and more of the classroom activity with less and less involvement on the part of the student. This leads to a passive, boring, irrelevant atmosphere as perceived by the secondary school youngster.

Dr. DeLay found that less than 20% of the time is spent in the classroom discussing student opinions or ideas. Further, much of the discussion that was conducted in the classroom was done to gain rewards, avoid punishment, or to please the teacher. Nearly 1/3 of the students interviewed felt that most teachers expect agreement with their ideas in exchange for a good course mark. Less than 50% of the students felt that grades would not be affected if they expressed their true attitudes and feelings. In addition over 1/2 of the students accused the teachers of seldom or never listening to their opinions in such a way as to show appreciation for student opinion. Therefore, the students seem to feel that they were getting negative feedback from their teachers.

Psychologists say that people behave in such a way so as to fulfill the expectations others have of them. It would seem then that effective learning would take place in a healthy environment in which a pupil has high self-esteem. However, in the study of

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[1] The Learning Process, An Educational Assessment of Fresno Unified School District, Fresno, California, 1968. Dr. Donald DeLay, Olan Knight, David Nyberg.

Dr. Delay, he found that over fifty percent of the students felt that they were held in low self-esteem by their teachers. That is, the students felt that teachers didn't care, provided little individual attention or that the teacher didn't really listen to the students.

Although Dr. DeLay's study is not intended to present a generalized picture of education, one can certainly speculate that it represents the conditions in a good many of our schools.

The advocates of flexible scheduling suggest that some of these ills can be treated using a more individualized approach to learning.

Speckhard[2] conducted an evaluative study of the effect of a flexible-modular schedule upon the student's academic achievement, study habits and attitudes, ability to think critically, and development of self-direction and self-responsibility. He used an experimental and control high school to measure these areas with the experimental high school being the school that had been engaged in a flexible schedule.

Using the Watson-Glaser test and the Iowa Tests of Educational Development, he found that the experimental students were able to think critically and interpret reading materials more effectively than the control students. No differences as measured by the Brown-Holtzman Survey of Study Habits and Attitudes was found between the two schools in the study.

He found that in six of the nine areas measured by the ITED, the experimental sophomores showed significantly more growth than the control sophomores. No academic differences were found between juniors in the experimental and control schools academically.

Speckhard also administered questionnaires to teachers and students in the experimental school to measure five areas:

(1) attitudes toward large group instruction
(2) attitudes toward small group instruction
(3) attitude toward supervised study
(4) attitude toward unsupervised study
(5) attitude toward overall flexible-modular program

He concluded that large group instruction affords a conservation of teacher time so that teachers can work more with students on an individual basis in the small group and supervised study sessions. Also, students are given opportunity to organize and record lecture materials. Complaints of teachers included lack of time to prepare audio-visuals, difficulty in retaining student attention, and ineffectiveness of lecture for students from differing ability levels. Students felt that little opportunity to ask questions, keeping up with teachers and lack of variety of presentation were some shortcomings of large group presentation.

Some of these weaknesses were compensated for in the small group instruction. Although teacher-led discussions were most popular, students did gain opportunity to

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[2]Gerald P. Speckhard, "Evaluating the Modular Schedule," NCA Quarterly, XLI, Spring 1967, pp. 301-08.

organize and lead the small group. Student participation was widespread. Teachers were made aware of group techniques and requested inservice training.

Supervised Study provided opportunity for individual consultation with the teacher. In fact this consultation time can be scheduled on a one-to-one basis. Although many students did use the teacher as a consultant, several students wasted time, distracted other students and required discipline as in any study hall.

Good students used unsupervised study time to get homework finished more effectively than before modular scheduling. Many students, however, waste free time. The school using modular scheduling needs to be aware of the need for programs available to all students for using free time constructively. In fact some schools have abandoned the flexible schedule primarily for this reason. Students were found to be roaming the halls, sitting in the parking lots, or making unwelcomed visits to shopping centers. Low achievers tend to have more difficulty adapting to the flexible schedule than do average or above average students. Also, sophomores have more difficulty adjusting than do juniors or seniors.

Mr. Richard Stauffer, Principal of LaDue Missouri has expressed that after studying the kind of high school graduate that society will demand 20 years from now, requires schools to implement innovation in the school program. Largely due to this conviction LaDue implemented a flexible schedule within certain course areas in September of 1967. Approximately 1/4 of the 1600 high school students participated in individualized instruction, independent study, and flexible grouping. These innovations were tried in English, Social Studies, mathematics, science and foreign language. Students reacted favorably to large group instruction, but indicated that the small group instruction complemented, clarified and expanded the material presented in the large group. The biggest complaint of the students was the lack of opportunity to participate verbally in the large group instruction. Small groups provided students opportunity to debate, express opinions, participate more than the regular classroom and have student-led discussion without the teacher present. This provided more opportunity for the student to internalize what he was being taught. A seminar atmosphere can prevail in which the teacher acts as the organizer and guide rather than the main disucssion leader. However, as might be expected, the LaDue students revealed that one of the major weaknesses of such a seminar atmosphere was that only certain students participate. These students were probably those that were able, prepared, and outgoing. The challenge for educators is to involve the other students who hesitate to take an active group role. Students also reacted favorably to the idea of merging two content areas into one package, such as English and Social Studies. The schedule can be planned in such a way that both subjects can be combined into different day met and module patterns in order to complement each other.

Finally, the LaDue students enjoyed the opportunity for independent study. Although they admitted to wasting some time, they feel that they got more done. They liked the idea of being able to take an examination in a course when they felt as if they were ready (sort of a contract to be completed). They liked access to the laboratories and quiet study areas according to their own needs and demands. One might hypothesize that this is part of the enjoyment of independence that all young people seek. On the other hand, one might ask

what's wrong with meeting students where their interests and attitudes are found. If effective learning can take place, fine. LaDue students said that due to the innovation program, they tended to enjoy school more and looked forward to school next year. They didn't overwhelmingly feel that they had learned more than before the innovation program, but what they learned was more meaningful.

Finally, Delavan-Darien, Wisconsin, under the direction of Mr. Chris Poulos[3] conducted an indepth study of the effects of flexible scheduling during the 1967-68 school year. The report prepared by the Faculty Evaluation Committee is so thorough that I can't do it justice. I can only highlight their activity.

The evaluation was done by using available measuring instruments, locally constructed attitude scales and opinionnaire, and observation. An attempt was made to determine achievement gain; feelings by students, parents, and faculty; and the behaviorial patterns of the students during unscheduled or free time.

In order to evaluate the total program, four separate studies were conducted. The Achievement Study was designed to assess pupil progress during 1967-68. The Opinionnaire Study was designed to sample pupil, faculty, and parent attitude toward the new scheduling scheme. The shadow study was designed to collect observable data about student learning patterns during unscheduled time available to the students. Finally, the Head count Study was conducted to evaluate the utilization of the Instructional Materials Center, the Resource Center, Study Areas, and open laboratories.

Recall that one of the objectives of flexible scheduling as outlined by Dave Beggs was to provide better use of facilities and another was to provide students with the opportunity to study independently. The Head count study was designed to assess these objectives. First, the amount of unscheduled time available was determined, and then the extent to which facilities available to students were used was calculated. (The unscheduled time included independent study time, planning, preparation, open lab, research time, relaxation, -- not free time.) During the Headcount study, the number of students that frequented the open labs, student lounge, cafeteria area, etc., was tabulated, as well as the number of modules of time during an instructional cycle for which the unscheduled facilities were available. It was found that 60.5% of a typical student's time was scheduled and 39.5% of his time was unscheduled.

The data collected revealed that well over two-thirds of the available unscheduled time was spent by students engaged in learning activities and only 23% of the unscheduled time was spent in relaxing activities (cafeteria-student lounge). Objective evidence was tabulated to show that students were indeed making use of free access areas meaningfully during their unscheduled time available. Also the study revealed the need for more spaces in the Library-Resource Center, and ways in which to better use all of the open lab facilities.

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[3]"The Evaluative Study of the Delevan-Darien High School New Design Instructional Program," Delevan-Darien High School, Delevan, Wisconsin, 1968

A second study was conducted at Delavan-Darien to evaluate individual student behavior during unscheduled time. The study was called the Shadow Study, simply because a random sample of students were shadowed by trained observers. The observers were senior education students from the University of Wisconsin and were trained to shadow a random student for 16 modules or one complete school day. Eighty-one such students were shadowed. Nearly equal representation from each grade level was also determined. In addition, the students ranged from well above average to well below average on the Iowa Tests of Educational Development composite scores.

The study revealed that as students progress from grades 9-12, the ratio of unscheduled to scheduled time increases. (Unscheduled activities were studying individually studying with other students, working in open lab, scheduled back to the teacher or guidance office, traditional study hall.) As might be expected, some students of lower ability were found to abuse the unscheduled time opportunity. These students tended to waste time in the student lounge and cafeteria. Therefore the administration used these data to implement procedural revisions in some students' schedules. More schedule back and open labs were found to be needed. More scheduling density is needed for students from lower ability levels. The course load, however, should not be increased.

An opinionnaire study was conducted to validate an opionnaire about the program from the previous year. Opinionaires were administered to faculty, students, and parents. Comparisions were made on common questions for the three separate questionnaires. Much agreement was found as to the effectiveness of the flexible schedule by all three groups. The flexible schedule affords opportunity to capitalize on student interests, teacher efficiency, and attitudes of parents, as well as faculty and students. Parents and faculty expressed concern over the lack of schedule-back activity with guidance or administration personnel. Although the overall assessment of the program was very positive and constructive, no effects were detected due to grade level, sex, achievement, or plans after graduation. In other words, the program seemed to appeal to all students generally. Of course specific weaknesses were detected, such as the need for more open labs and more desks in the resource center. Examples of questionnaires that can be put together for evaluating a flexible schedule are available from Mr. Chris Poulos (MRC) or Mr. Bill Lawrence (IEIC).

The best way to evaluate the effectiveness of any learning program, of course, is to determine how well children achieve. This can be done through the use of standardized achievement tests and through pre and post teacher-made examinations. The Iowa Tests of Educational Development were used by Delavan to compare typical achievement for a school year in which flexible scheduling was used versus a year in which a traditional scheduled was used. The results indicated that students did achieve as well as expected, that students did show normal growth over a two-year period. Growth was compared with both National and Region I norms.

It should be noted here that growth scales have recently been determined for the ITED so that expected and observed growth comparisions can now be readily made, much as physical growth has been studied in the past.

Of course not all achievement can be measured with standardized tests. The best measure of growth within a specific subject matter course are tests designed to measure the behavioral objectives outlined for that course. This means that an effective teaching staff needs to conduct a five phase evaluation of teaching effectiveness. First, time needs to be taken to define the course objectives in behavioral terms. Second, a preassessment of those objectives needs to be made at the beginning of the course. This may lead to a redefinition of course objectives or a shift in emphasis of course content. Third, the instructional plan should be implemented. Fourth, an assessment of the learning objectives should be made after instruction has taken place. Finally, the amount of student growth that has taken place can be used to help evaluate the teaching effectiveness for the course.

The preceding paragraphs were designed to suggest that a proper way to evaluate flexible scheduling includes observation of behavior, the measurement of attitudes and opinions, and assessment of pupil achievement.

Observable behavior can be evaluated by recording patterns of classroom activity. For example, every two or three minutes of time a record can be made of what a particular student or teacher is doing in the classroom. This can be done using such instruments as a camera, a checklist, and a tape recorder. Similar observation can be made of students during independent study time. After the data are collected an analysis can be made of student and faculty behavior.

Opinionnaires can be constructed to assess the student, teacher and parent view of flexible scheduling. Questionnaires can be formulated to rate the effectiveness of the guidance program. For example:

(a) Small group counseling has improved with flexible scheduling
(b) The student dropout rate has improved with flexible scheduling.
(c) The number of student conflicts has been reduced as a result of flexible scheduling.

Independent study can be assessed as well by asking opinions on such things as:

(a) Students unable to adjust to independent study should be assigned to a supervised study hall.
(b) Resource centers should be provided for students and teachers in each subject field.
(c) The amount of independent study should be based on the student's age, grade level, and maturity.

Large group instruction effectiveness can be assessed by asking opinions from faculty, and students about such issues as:

(a) the most effective large group instruction should be limited to 40 minutes.
(b) The teacher should dominate large group instruction.
(c) Teacher aides reduce clerical duties of a large group instructor and allow him ample time to prepare for his classes.

Small group activity can be evaluated by asking opinions such as:

(a) Small group discussions are enhanced when students assume special roles such as: group leader, recorder, and observer.

(b) Classes ranging from 5-15 students should be regularly scheduled as a part of the instructional program.

(c) Two small group discussions per week for each course should be standard.

Teacher opinion can be evaluated with such statements as:

(a) Staff morale improves as a result of a flexible schedule.

(b) The flexible schedule provides more time for individual consulting with students.

(c) Students assume more of an active role in learning under a flexible schedule.

Other data that can provide insight about the flexible program are such things as comparing the number of discipline cases with the year before flexible scheduling was started; determine if school attendance has improved; determine if more children are participating in extra curricular activities; determine if graduates of the school behave differently than before flexible scheduling, and if they feel the flexible schedule was an improvement in preparing them for post high school.

Teaching effectiveness can be determined by using tests available before flexible scheduling to compare achievement under both types of schedules. The course objectives need not change, just the approach to teaching those objectives. Therefore comparisons can be made between the achievement of students before flexible scheduling with those after flexible scheduling.

It appears that with the way that flexible scheduling can be evaluated and with the results of evaluations that have been made by schools using it, that flexible modular scheduling deserves a careful examination.